R E P O R T R E S U M E S

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EXPERIMENTAL PHONETIC READING PROGRAM FOR EXCEPTIONAL PUPILS.

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DESCRIPTORS- *READING RESEARCH, *EXCEPTIONAL STUDENTS, *PHONICS, *PROGRAMED INSTRUCTION, EMOTIONALLY DISTURBED, NEUROLOGICALLY HANDICAPPED, MENTALLY HANDICAPPED, READING ACHIEVEMENT,

A PROGRAMED SEQUENCE OF INSTRUCTION IN PHONICS FOR EXCEPTIONAL STUDENTS WAS DESIGNED, AND THE PROGRESS OF PUPILS TAUGHT WITH THIS PROGRAM WAS EVALUATED. PUPILS WERE DIVIDED INTO THREE GROUPS--THE EMOTIONALLY DISTURBED, THE NEUROLOGICALLY IMPAIRED, AND THE MENTALLY RETARDED. THE SCORES OF 17 STUDENTS FROM THE LOS ANGELES AREA WERE INCLUDED IN THE ANALYSIS OF THE DATA. THE AGES OF THE PUPILS RANGED FROM 6 TO 14 YEARS. THE PROGRAM WAS CONDUCTED FOR 9 MONTHS, AND THE STUDENTS WERE INSTRUCTED 3 TIMES PER WEEK. THE DEPENDENT VARIABLES WERE THE NUMBER OF CORRECT RESPONSES AND THE RATING OF A BEHAVIOR RATING SCALE. PRETESTS AND POST-TESTS WERE ADMINISTERED. ANALYSIS OF VARIANCE, T TESTS, AND CHI SQUARE WERE USED TO ANALYZE THE DATA. THE EMOTIONALLY DISTURBED AND THE MENTALLY RETARDED PUPILS MADE SIGNIFICANT PROGRESS BETWEEN THE INITIAL AND THE TERMINAL PERFORMANCES IN THE EXPERIMENTAL PROGRAM. PUPILS WHOSE AGES WERE BELOW THE MEDIAN OF 8 YEARS MADE MORE SIGNIFICANT PROGRESS IN THE PROGRAM THAN DID PUPILS WHOSE AGES EXCEEDED THE MEDIAN. ADDITIONAL RESULTS, CONCLUSIONS, RECOMMENDATIONS, AND A BIBLIOGRAPHY ARE INCLUDED. (BK)

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EXPERIMENTAL PHONETIC READING PROGRAM FOR EXCEPTIONAL PUPILS

by

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Interest in the reading problems of the normal child should not obscure those difficulties encountered by children who, for one or more reasons, are exceptional. In the interests of learning more about the reading process, and in the hope of providing assistance to both normal and exceptional children, this research project was begun.

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Dolores Warner, Ph.D.

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CHAPTER I

THE PROBLEM

Introduction

How an individual relates to the world is based largely on his comprehension of the world. To a great extent, that comprehension is verbal-- both oral and written, and is related to his ability to read.

For children who are severely emotionally disturbed, neurologically impaired or mentally retarded, development of reading skills may have a therapeutic effect in that such children are thus enabled to participate to a greater extent in the socialization, intellectual and emotional experiences which contribute to greater humanization and self-effectualization.

In 1964, Hewett reported progress made in reading with children at the Neuropsychiatric Institute, U.C.L.A. Center for the Health Sciences (36:48).* In 1966, he reported to the Annual Meeting of the American Orthopsychiatric Association on "An Experimental Reading Program for Neurologically Impaired, Mentally Retarded and Severely Emotionally Disturbed Children" which he developed with Mayhew and Rabb. The NPI program incorporates a modification of instructional techniques developed at the Rainier School in Buckley, Washington. With the use of this program, they found that such children make significant progress in the acquisition of a basic sight vocabulary.

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*Numbers within parentheses refer to numbered titles in the bibliography. A colon precedes the page number on which the quotation appears.

The Problem

The progress reported with the acquisition of a basic sight vocabulary by exceptional pupils at NPI appeared to warrant investigation into the possibility of teaching such children phonetic skills and independent word attack, using a program developed for that purpose incorporating techniques used at the Rainier School and NPI. The design and sequence of this phonetic program emphasized the relationship between sounds and letters as they were encountered by the pupils within words, in order to develop these phonetic skills and method of independent word attack.

Purpose

The purpose of the study was to design a programed sequence of instruction in phonics for exceptional pupils and to evaluate the progress of such pupils taught with this program. The pupils participating in the experimental phonetic reading program were identified within three groups: (1) emotionally disturbed, (2) neurologically impaired and (3) mentally retarded.

Design of Study

The evaluation of the progress of such pupils to this phonetic program was measured by drawing comparisons between: (1) initial and terminal scores within these three groups and (2) the scores between groups. In addition, observers were present to witness the reading instruction. They recorded behavioral data which was also compared in

order to ascertain affective reaction to the instruction with the experimental phonetic reading program.

The experimental design included analysis of the factors sex-of-pupil, age, intelligence and impairment. The study was designed to test the Null Hypothesis of no significant difference (1) among pupils between the beginning and conclusion of instruction with the experimental phonetic reading program and (2) among pupils within the three groups for which the phonetic program was designed. Reading progress of boys and girls was compared, as well as intelligence level and age.

Hypotheses

This study was designed to test the Null Hypothesis that no significant difference would be found to exist in the following areas with regard to instruction with the experimental phonetic reading program:

Hypothesis

1.0 Initial and terminal scores within each of the three groups of pupils involved. No difference was expected.

2.0 Scores between each of the three groups of pupils involved. No difference in achievement levels between the three groups was expected.

3.0 Intelligence quotient of pupil. No difference was expected in achievement between pupils with regard to their intelligence quotient.

4.0 Sex of pupil. No difference in achievement levels between girls and boys was expected.

5.0 Age of pupil. No differences in achievement levels between pupils was expected on the basis of age.

6.0 Rating of behavioral data. No differences were expected among rating made by observation teams with regard to the behavior of pupils in the experimental phonetic reading program.

7.0 Evaluation by staff. No differences were anticipated between members of the teaching and observational staff with regard to evaluation of the experimental phonetic reading program.

8.0 Parent and administrative evaluation. No differences were expected in the evaluation of pupil participation in the experimental phonetic reading program.

Scope and Delimitation of the Study

The study was confined to the Los Angeles area. Publicity concerning the research project and information as to how to refer children was disseminated in newspapers in all areas of the city, in both newspapers which were purchased and those which are delivered free. This was done in order to randomize the provision of information concerning pupil referral so that subjects for the research would have an equalized chance to be drawn from any section and socio-economic level.

In order to further insure that pupils of all socio-economic levels might participate, those pupils whose mothers could not bring them to the U.C.L.A. campus for the instruction, due to lack of trans-

portation and/or that the mothers worked, instruction was provided at a nearby public elementary school which is an educational center for exceptional students.

Pupils were accepted for participation in the study who knew the vocabulary in the pre-primers of the Ginn reader series. This series was selected since it is widely used in the public schools in the Los Angeles area. This increased the chances of pupils knowing the words which had to be within their sight vocabulary, since such words were used as vehicles for the introduction of the phonetic program. This increased the chance for confrontation with one learning task at a time, since the recognition of the word as within their sight vocabulary then permitted them to focus on the learning task involved with its phonetic properties.

Referrals for pupils who had been diagnosed as emotionally disturbed, neurologically impaired or mentally retarded originated with schools, parents, physicians, psychologists and public agencies. The mental retardation was limited to the educationally mentally retarded with the lowest intelligence quotient at 59. The research project continued for nine months, from October 1966 through June 1967. Each pupil had one teacher who taught and recorded the data for the experimental phonetic reading program. Also assigned to each pupil were observers who witnessed the instruction and evaluated affective factors according to a rating form. Lessons were given to each pupil three times each week. A total of nineteen pupils participated.

Importance of the Problem

There is much interest and activity in the area of reading

instruction. At the same time, there is also much work being done in programing of reading instruction. It is certainly important to also explore reading instruction for exceptional children. These children derive as much benefit, if not more than pupils in the schools, as a result of achievement in the acquisition of reading skills. Because of their impairment, exceptional pupils are often children who experience solitude and lack of opportunity to interact with their peers. The ability to read and to acquire the additional knowledge and vicarious experience to be derived from books is of crucial importance to them.

In addition, the findings resulting from such research in phonetic reading instruction with exceptional pupils can be of value in developing programs in remedial and developmental reading.

Definitions

1. Severely emotionally disturbed--pupils whose school experience has been affected by emotional difficulties which they have had of a nature sufficient to:

    a. Warrant their exclusion from regular school.

    b. Warrant their placement in a special school, social adjustment class, with a tutor and/or under professional care.

    c. Render diagnosis by qualified professional people indicating that these children are severely emotionally disturbed.

2. Neurologically impaired--those pupils who have impairment of any of their five senses whether by congenital deformity, injury or other causes.

3. Mentally retarded--those pupils for whom test results from schools and agencies indicate intelligence quotients between 60 and 75, the range of educable mental retardation.

4. Prompting--the cueing used in the presentation of items. For this study, these include the verbalization by the teacher, the nature of the item to be taught and the forms which were introduced and faded in order to facilitate learning.

5. Reinforcement--this refers to the primary and/or secondary reward which is used to facilitate learning. For this study, secondary reinforcement was used, including verbalization by the teacher, knowledge of results, visual confirmation of correctness and seals given children at the end of the lessons.

CHAPTER II

REVIEW OF RELATED RESEARCH

The areas of research related to this study include: (1) research dealing with the child who is exceptional in terms of emotional disturbance, mental retardation and/or neurological impairment such as vision, hearing or speech as well as (2) research relevant to programing of reading instruction and (3) research pertaining to the methods of presentation of reading instruction which has been programed.

The effect of these research findings on the formulation of the experimental phonetic reading program are also traced in this chapter.

The Exceptional Child

Emotional Disturbance

In 1964, Shinmota found that anxiety about reading and performance-verbal intelligence quotient discrepancy were foremost criteria in differentiating the adequate from the disabled readers (65:110). The findings of Siegal concur with those of Shinmota. Siegal pointed out that the way in which the anxiety is resolved has implication for reading achievement. Some subjects demonstrated their anxiety through disobedience,aggression, withdrawal or other behavioral deviations and appear to resist the pressures of the environment. However, other subjects expressed their anxiety by failing to learn. In a society where academic achievement is prized and reading is necessary for such achievement, lack of reading progress becomes a

way to react against the society and the immediate environment in which the pressure is being generated(66:412).

It is important to note that for those within the former group who resist the environmental pressures by agression or withdrawal, reading progress is frequently enhanced. The agressive individual sometimes uses reading and the knowledge gained through reading as a way to assuage anxiety through excelling in competitive areas. However, withdrawal can also be achieved through reading and often those who are predisposed to this preference are those who possess the skills and potential for further development of skills necessary for such symbolic interpretation. On the basis of his research, Tamkin concluded that educational disability such as difficulty in reading may be a symptom of the same condition producing the emotional problems (69:314).

Allison Davis has observed that acceptance by the teacher is a powerful reinforcement because it reduces the inner tension caused by the child's anxiety and fear. Bloom indicates that this reduction of inner tension not only provides a powerful reinforcement in itself, but it also permits the higher cortical centers to function (19:304).

According to Cruickshank, rearing a child who deviates from the norm in any respect presents parents with problems. The way in which the parent reacts to this profoundly affects the child. Bringing up a normal child involves problems, but rearing an exceptional child is far more demanding of the physical and mental health of the parents (25:466).

Because extensive reading disability appears to indicate

emotional disturbance, it is important to point out that emotional disturbance does not always lead to reading disability. However, where reading disability has resulted in emotional difficulty, or has, to some extent, been caused by it, there appears to be some influence exerted by the familial pattern. For example, Missildine reported that mothers of disabled readers who were also emotionally disturbed tended to be aggressive, perfectionalistic or overly hostile toward their children. The fathers were away from home most of the time. Some were stern disciplinarians, overtly hostile or took little interest in their child (50:272).

Mental Retardation

Jones reports an approach to reading used with retardates which incorporated a simplified phonics approach leading into the pre-primer. He used the blackboard, flash cards and drill. His results indicated comprehension scores between first and third grade level (40:368). Davy also investigated the teaching of reading to retardates. This group, with intelligence quotients between 50 and 75, used one sound for each letter. This sound was later combined with others previously learned (26:274).

On the basis of their research, Zeaman and House concluded that retardates have difficulty with discrimination (71:63). Therefore, they recommended that any reading program for such pupils start with easy discrimination tasks and progress gradually toward more difficult levels (71:64). In research together with Orlando, they found that the approach to the positive cue may be more significant than the avoidance

of the negative (33:78).

On the basis of several studies, Hermelin and O'Conner concluded that solution of learning problems requires internal verbalization accompanying the external motor activity (53:409). This reflects the philosophy of inner speech which was held by Vygotskii (12:19). Retardates do not possess the association necessary between motor and verbal systems for this type of problem solving. Therefore, in the type of discrimination tasks necessary in reading instruction, a specific verbalization of the problem solving technique will increase learning efficiency for the retardate (53:411).

According to Sarason, the mentally retarded child does not solve as many problems correctly as does the normal child. The retarded child requires more time for solution and frequently still cannot find a solution to a given problem (63:454). Language and symbolic processes such as reading are severely limited for these children. Three groups of retarded are mentioned:

idiot	0-25 IQ
imbecile	25-50 IQ
moron	50-70 IQ

Results of research indicate that under certain conditions, children of the latter category, 50 to 70 intelligence quotient, can develop reading skills.

Neurological Impairment

Vision

According to Lowenfeld, the partially seeing child is defined

as that individual having visual acuity 20/70 to 20/200 corrected in the better eye (46:273). More impressions reach the brain for interpretation through the sense of sight than through all the other senses combined. Therefore, any deviation from normal sight has an effect on reading (4:999).

The visual process is involved in word perception and in the arousal of associations that result in the recognition of words, their meanings and pronunciation (4:1096). Eames found that hypermetropia (far-sightedness) and exophoria (muscle imbalance) constituted obstacles in the development of word recognition (28:716).

In 1941, interest in the partially sighted was emerging chiefly in the area of organization and administration of, equipment for, classes for these children. However, little was known about the children themselves, from a psychological point of view. In 1956, Lowenfeld did not feel that conditions had changed appreciably since the partially sighted child is regarded as a seeing child and thus is catagorized within that group of children who deviate slightly from the normal (46:273). Lowenfeld felt that there are aspects of this condition which merit investigation. For example, he felt that in the area of language and reading instruction, the blind and partially seeing children cannot be aided in their learning of speech by imitation which plays so great a role in the development of sighted children (46:237).

Hearing

According to Meyerson, acoustically handicapped children have been found to have unrealistic levels of aspiration in that they

aspire too high or too low and are unable to change their aspirations in the light of performance results. Whereas well-adjusted children tend to aspire just slightly above what they have previously achieved, and readily raise or lower their aspiration level in accordance with past performance, the maladjusted child does not appear to possess this ability to a similar extent (49:136).

There are two principal types of hearing impairment:

a. Conductive

b. Nerve or perceptive, sometimes referred to as nerve deafness (4:996).

Primary children with hearing loss have difficulty in reading, spelling and phonics, according to the findings of Fieldler (32:621). Duggins concluded that auditory perception of words comes first in the process of learning to read (3:38). Robinson agreed that auditory discrimination is vital in the initial reading instruction. She indicated that auditory discrimination appears basic to phonics and that the influence of auditory and visual discrimination together is greater than that of intelligence in learning to read (59:268).

Speech

Eisenson indicates that defection in speech is characterized by any one or more of the following criteria:

1. It is not readily audible.

2. It is not readily intelligible.

3. It is vocally unpleasant.

4. It is visibly unpleasant.

5. It is labored in production, or lacking in conventional rhythm or stress.

6. It is linguistically deficient.

7. It is inappropriate to the individual in terms of his age, sex and physical development.

8. The speaker responds to his own speech as if one or more of the above were present (30:184-185).

The chief disabilities etiologically associated with defects of speech include cleft palate, cerebral palsy and hearing impairments (30:194).

With regard to reading, it is possible that the child's awareness and anxiety concerning his atypical articulation may interfere with his ability to concentrate on, and so, to comprehend what he is reading (30:192).

The behavior of many children with speech problems is marked by impulsiveness. Their capacity for adjustment or maladjustment exists just as for children whose articulation is normal. With the child who has speech difficulty, however, this capacity is not as expertly made manifest (30:204).

In the opinion of Hildreth, a history of speech defects is prominent in reading failure. Children with speech defects read orally more slowly than children with normal speech and are often on an average of one grade below normal in comprehension and two grades below in rate of reading (37:548).

Programed Instruction

Consideration of the Emotional Aspect

The insight which the child develops and the intuitive process in which he is involved in the act of learning to read make reading instruction an abstract and symbolic endeavor. As the child realizes that reading is involved with the interpretation of ideas in graphical representation, he glimpses the logic inherent in reading. Reading and writing are extensions of the act of basic communication. As such, they are vital skills in a society in which knowledge proliferates at such a rapid pace and publishing and education are consistently addressed to the task of achieving and maintaining recency.

This grasp of the essential nature of reading is related to the language skills of the child, which are closely related to the coping ability of the child. His ability to cope, to meet new challenges, is cumulative and is closely identified with the child's sense of identity (7:255). According to Murphy, this is not limited to his ability to meet the challenge of the printed word, but is also related to his ability to manage other aspects of his environment. The cumulative effect on his coping ability and sense of identity enables him to face new aspects of his environment with increased ability and confidence.

This cumulative effect is related to greater ability to perceive relationships, to internally verbalize the ideation involved in a situation and to interpret, formulate and proceed with ideational strategy. Since these are the steps involved in reading itself, the basic awareness of what reading is, exerts a great influence on how a

child proceeds in learning to read, which, in turn, affects his coping ability.

Increased coping ability sometimes extends beyond reading to other subject areas. For example, Scott discovered in 1963 that improvement in reading ability may lead to improvement in arithmetic reasoning, social studies and science. Spelling may also improve (64:323). Good readers are often good spellers. Poor spellers often have difficulty because they cannot read their spelling words and hence, cannot identify them or relate meaning to them. Therefore, improvement in reading often also means improvement in spelling.

The merit of programed instruction has already been demonstrated by Pressey at Ohio State University and Skinner at Harvard University. While Pressey emphasized a multiple-choice presentation, Skinner preferred that the student construct his own answers. With respect to error, Pressey would allow for its occurence and provided corrective techniques. Skinner preferred to have the student structure his own answers with encouragement and reward for correct responses (5:138). Skinner placed greater emphasis than did Pressey on the smallness of the learning steps and their sequence. Skinner believed that individual differences should dictate the size of the steps and their sequential arrangement, i.e., where students have difficulty in learning, the steps should be made smaller and greater attention devoted to logical sequential arrangement. Skinner believed that the results of performance should be immediate and correct (5:143). While Pressey's primary emphasis was on recognition, Skinner's was on recall (5:140).

The use of programed instruction was explored with children of elementary school age. For example, in 1959 Keislar did research on the development of understanding in arithmetic using a teaching machine with fifth and sixth graders. He found that the program was more appropriate for brighter children (41:251). He recommended that smaller teaching steps be used (41:252). This corroborated the 1958 findings of Homme and Glaser and those of Coulson and Silberman in 1959 (82:81).

Previous Work With Programing For Exceptional Children

Gradually, the principles of programing came to be applied to the teaching of exceptional children. In 1965, Bijou reported his progress using the application of operant conditioning to the teaching of reading, writing and arithmetic to retarded children. Birnbrauer collaborated with Bijou in the investigation of a programed approach to the instruction of mental retardates.

With reference to the programing of reading instruction, Birnbrauer described such a program using both multiple-choice and constructed-answer examples (16:2). He also described the giving of poker chips which could then be used to obtain primary reinforcement such as edibles (17:278). He concluded that such tokens serve as a non-distracting intermediate between immediate and delayed tangible reinforcement (17:278).

In 1966, Hewett reported on an experimental reading program designed by the Neuropsychiatric Institute School, University of California, Los Angeles, for use with neurologically impaired, mentally

retarded and severely emotionally disturbed children. This program is a modification of procedures for reading instruction used in the Rainier School project (36:36).

The reading program developed at the Neuropsychiatric Institute School consisted of five parts:

Part I Oral reading review of words learned on the previous day.

Part II Vocabulary building using systematic presentation of new words on the Grolier Min/Max II.

Part III New oral reading in a basic reader.

Part IV Comprehension involving questions about the content in the new chapter, read from the book.

Part V Discrimination exercises with the newly learned words emphasizing initial, medial and final word completion and discrimination (36:38-40).

The progress reported by Hewett, Mayhew and Rabb with children in the acquisition of a basic recognition vocabulary appeared to warrant further investigation of the possibility of teaching such exceptional children phonetic skills and independent word attack. Bijou, Birnbrauer, Kidder and Tague recommended in 1966 that training in the use of self-prompting techniques should be a part of programed instruction. Following the acquisition of a sight vocabulary the child should be given training in discriminating the sounds of letters. They indicated that this should be included in the reading program in order to enable the child to "sound out" words he did not recognize on presentation (15:521).

According to Betts,

> The pupil should be taught how and when to apply his phonic skills to unknown words. If he has not learned his phonic skills, his situation is as hopeless as trying to beat water uphill with a

stick. If he has learned them, his success with this systematic examination of written words is always clearly in sight (14:536).

The Experimental Phonetic Reading Program

Content

The content of the experimental phonetic reading program was organized around the concept of phonic generalization. This concept involves the presentation of several words in which an initial letter, for example, in each word yields the same sound value. The "c" sound in "cap", "cat", "cab" is an example of such a concept.

Phonic Generalizations

According to McKee, two to three phonic generalizations per lesson are sufficient exposure for the development of a phonic generalization (6:259). This approach is based on the regularity of the English language. In a 1953 study, Moore concluded that there was considerable consistency in the vocabulary of school children. He deplored the fact that many educationl methods did not reflect this, and he recommended that irregularities which he found make up no more than one-fifth of spelling patterns should not dominate the rationale in planning instructional methods and materials, especially in the primary grades (83:283).

In 1961, Bloomfield recommended that the sounds of the letters of the English language be introduced to children in a sequence of consistent phoneme-grapheme relationships. This sequence was to be

presented in whole words, progressing from simple to complex. The words were arranged in consistent patterns, stressing one sound at a time (1:42). This same principle was used in creating the experimental phonetic reading program. Whole words were used from the pre-primers of the Ginn reading series. One initial sound was stressed at a time, using a consistent pattern of words already found to be within the recognition vocabulary of the pupil. In 1966, Ruddell had found that a programed approach to reading which emphasized control of the grapheme-phoneme regularities was superior to a regular basal approach (61:659).

Use of Whole Words

This practice of using whole words as the frame of reference for the phoneme-grapheme examples was recommended by Bloomfield and also found to be effective according to the findings of Robinson in a 1963 study. These findings reveal that when context, configuration and structural analysis failed, analysis of words in their entirety would result in their successful identification (58:241).

Goldberg and Rasmussen commented as follows concerning this type of programing which they referred to as linguistic: " A linguistic approach would be based upon a very careful analysis of the consistency in patterns of symbol-sound relationships" (33:246). In their own three year study of reading instruction of first and second grade pupils, Goldberg and Rasmussen used a linguistic, or consistently organized sound-symbol progression. They found this system to be superior to former methods of instruction (33:247).

In 1964, Lefevre conducted a study of reading instruction and its relationship to primary language learning from a linguistic standpoint. He concluded that "corresponding sound and symbol must be taught in wholes" (44:202). Ricciuti made use of the whole word in a reading program. He reported that it is better to concentrate on the stimulus-as-a-whole, rather than on small isolated details of it (77:24).

The Use of the Initial Sound

The initial grapheme-phoneme relationship was used since it is perceived first. The results of a study by Edelman indicate that it is most effective to use the initial letter and its sound since the first letter of the word is the most important cue in word recognition. The last letter is second most important with medial sounds least important (72:10).

Basic Learning Concepts in Developing Phonic Generalizations

Ideational construct on the part of the learner is involved in the development of phonic generalizations. It is through the phonic generalization that the pupil associates certain appropriate sounds with certain letters and in this way formulates a method of deciphering unknown words. The ideational construct includes creativity, derivation of implication and mastery.

Ideational creativity. An intuitive method of conceptualization is involved in arriving at the phonic generalizations implicit in phoneme-grapheme relationships. If these generalizations are arrived at inductively, they will be reached in terms of the individual's own

ideation and internalized vocabulary, which, according to Vygotskii, accompanies thinking and problem-solving. With the exceptional child, reading instruction and, in particular, the development of phonic generalizations should proceed according to a logical sequence of incremental steps which permits this type of ideation.

Memory and transfer. The insight which the child develops in the process involved with the symbol-sound patterns, and the contribution which this makes to reading are closely related to his coping ability. His ability to cope, to meet new challenges, is cumulative and is closely identified with his sense of identity (7:255). According to Murphy, this is not limited to his ability to meet the challenge of the printed word, but is related also to his ability to manage other aspects of his environment. The cumulative effect on his coping ability and identity enables him to face new aspects of his environment with greater ability and assurance. This cumulative effect is related to greater ability to perceive relationships, to formulate and to proceed with ideational strategy.

With regard to the transfer value of this approach, Bruner stated: "From a relatively small number of experiences of speech categories it is possible to discover all the defining attributes of any future utterances--the phonemes of the language" (2:208). Commenting on the amount of transfer which occured when whole words were used in initial reading instruction, Gibson, Osser and Pick concluded:

Even though a child is presented with whole words and

> encouraged to associate the printed word as a whole with the spoken word, he also begins to perceive some regularities of correspondence between printed and written terms and transfers some of these to reading unfamiliar items (73:9).

Furthermore:

> This generalizing process undoubtedly promotes reading efficiency and could be facilitated by presenting material in such a way as to enhance the regularities and speed up their incorporation (73:9).

The experimental phonetic reading program was designed to enhance the presentation of the regularities in phoneme-grapheme relationships so that they could be generalized and transferred to the deciphering of unknown words.

Learning as phonic generalization. In the Taxonomy of Educational Objectives in the cognitive domain, Bloom included under comprehension the skills of interpretation and extrapolation. The section on analysis includes analysis of elements, relationships and organizational principles. Synthesis involves derivation of a set of abstract relations. Apropos of this with regard to reading, Burks and Bruce concluded:

> Poor readers as a group approach learning situations in a more concrete manner as a result of inability to handle abstractions. Since the reading process inherently consists of abstractions strongly depending on memory functions, these children are handicapped (20:490).

Appropriate to a discussion of personality with regard to the development of phonic generalizations and subsequent transfer to the pupil's repertoire of independent word attack skills is Bliesmer's opinion, arrived at as a result of personally-conducted research:

> Poor readers are deficient in the ability to synthesize phonetic elements of words into meaningful word patterns, while good readers apparently possess this ability to a marked degree (18:321).

These two authors recommended further study of the relation of general intelligence to ability to synthesize phonetic elements of words and also the effect on reading achievement of a training program in this area.

Consideration Of Ability Level

Silberman encountered an obstacle in his research with trigrams. He assumed that the children's difficulty in assimilating the phoneme-grapheme relationship of a trigram designed as an entire and meaningful word pattern indicated the necessity for some improvement of a deficiency in the research program itself (85:4). How Mulder and Curtin suggest that this difficulty may be due to the level of ability which children bring to the task. Lefevre concurs:

> This so-called ideational method of reading instruction succeeds only with pupils lucky enough to catch on by themselves to the trick of reading entire meaning-bearing language patterns as graphic counterparts of speech without explicit instruction in how to pick up the constituents of language patterns when they are presented in print. The sentence is the bedrock language pattern in American English, critically important in both writing and reading. Thousands upon thousands of unlucky persons do not catch on to the trick of reading sentences as entire, meaning-bearing language patterns (44:202).

In the face of these words of caution regarding the ability of students of lesser ability to handle the abstract relationships involved in grasping and applying phonic generalizations, Rudisill stated that the abstractness arises in the sound-letter relationship inherent in the nature of the phonic generalization, and that the relationship of sounds to letter symbols is more the result of specific training than of applied intelligence. Mulder and Curtin agree with Rudisill in the

conclusion that a training program, rather than an inductive program, should be used with less able students (62:266).

In 1960, Levin of Cornell, who collaborated on an extensive Basic Research Program in Reading, told the International Congress of Psychology in Germany: "An effortful motor act yields positive transfer effects to subsequent association learning, as does pretraining on the specific cues which are used by children in making visual-verbal associations" (76:10).

Meyer developed Levin's pretraining idea further, stating in a study of kindergarten children:

> If programed instruction were available for use in a visual listening center, small groups of children could receive advanced or remedial instruction. This could also free the teacher for tutorial sessions with children requiring individual and small group instruction (48:424).

In this connection, Katz and Deutsch suggest:

> Since poor reading is associated with difficulties in shifting from one sensory mode to another, there should be some experience or training in cross-modal interpretation, in using each input pathway as the originating stimulus carrier and striving for the appropriate associations necessary for these children (74:30).

Naeslund took the position that with less gifted children, an atomistic, letter-sound approach to reading instruction is superior to a more holistic program in which students begin learning the phoneme-grapheme relationships in a sentence setting. However, at both ability levels, children taught by the whole-sentence method tended to find reading more agreeable than those taught by the atomistic method advocated (52:22).

With regard to first-grade ability to perceive relationships and

to develop concepts of phonic generalizations, regardless of ability, Spodek found in 1962, that kindergarten children can retain an idea, analyze it, develop concepts and transfer these concepts to new situations. Therefore, it is very probable that first-graders possess similar ability.

The implication to be drawn from the opinions of these authorities is that, while an inductive approach may be successful with most students in the perception of the phoneme-grapheme relationships, it may not be as satisfactory with students of limited ability; with the latter, more traditional training programs may prove more effective.

The experimental phonetic reading program was intended as such a training program for use with children who were exceptional in terms of emotional or neurological difficulty as well as those who were mentally retarded. The content of the experimental phonetic reading program was designed considering the potential contribution that such phonetic knowledge and independent word attack might have to the reading ability and hence coping ability and emotional health of such pupils. Its content was also considered in terms of the ability level of the pupils who would use it. Because some of these pupils would be limited in their ability, the progress was designed as a training program with a high degree of guidance, consistency and repetition. Since some pupils using the program would also be exceptional in terms of neurological impairment, as in the case of vocal, auditory or visual limitation, the content of the program had to be designed in such a way as to provide a range of input so that all neurological impairment would

be accommodated.

Conclusions Resulting From Survey of Research and Influence of This On The Method of Presentation of the Experimental Phonetic Reading Program

Much research has been done to support the contention that the amount of involvement and learning increases as effective input or perception of content increases. Since this experimental phonetic reading program was to be used with children who had neurological impairment, it was important to furnish as much sensory input as possible. Therefore, input or presentation of each lesson in the experimental phonetic reading program involved auditory, articulatory, visual and tactile input. That is,the pupils heard the teacher as well as their own vocalization (auditory), they spoke (articulatory), they read the program (visual) and they wrote in answers for certain frames in the program (tactile). Research indicates that such an approach, using a multi-sensory presentation, tends to enhance learning.

Oral input. Sofietti concluded from his work that a multi-sensory process should be used with emphasis on vocalization. He felt that vocalization by students occurs too late in reading instruction, since it is vocalization that releases the meaning or ideation (67:67).

McNeil and Keislar corroborated this theory in 1953 as a result of research in arithmetic instruction presented with a teaching machine. They reported that the oral response facilitated recognition and comprehension of printed words and sentences (47:163). One way to explain the mechanism involved in this improved achievement with

overt vocalization is that the distinct stimulus of saying words aloud is required for meditation of the association. This, in turn, stimulates the meaning which an individual has learned to associate with the word. Such an explanation seems to support the linguistic approach, with its emphasis on oral presentation.

Auditory input. If there is an oral presentation, then the possibility of auditory facility is also involved. In 1962, Squire stated that too much attention is being given to visual discrimination, and that additional attention should be given to auditory discrimination. His conclusion was based on an investigation of all types of word recognition (63:538). In 1957, Triggs had found that auditory presentation affects comprehension items more than it affects recognition items (70:6). Schellenberg's 1962 study revealed that a specific word perception ability was related to success in reading (84:178). The findings of a 1953 study by Poling indicated that auditory ability was related to word discrimination (56:110), that low auditory acuity did not often cause poor word recognition, but that the auditory memory span might be a significant factor. In 1963, Chall, Roswell and Rosenthal conducted a study on auditory blending ability and found it to be a significant factor in reading success (22:116). Another 1963 study by Robeck listed three factors as contributing to a lack of word-analysis skills: (a) minimum school entrance age, (b) poor auditory memory and (c) poor visual memory (57:433). Concurrently, Plessas came to the conclusion that children with high auditory discrimination develop advanced skill in the recognition of printed words and are capable,

therefore, of greater independence in reading than are children with low auditory ability (55:225).

Thompson's 1961 research led to the conclusion that the status of auditory discrimination at the beginning of first grade is highly prognostic of those who will become good readers; and also the recommendation that children with low auditory discrimination be given an extended readiness program in which exercises to develop this type of audio discrimination are presented (86:786). In 1965, Berg interpreted the results of his research to indicate that in grades one through three, listening is a more effective medium of communication than other sensory input used singly (13:59).

Visual input. Donald Durrell and Sister Harrington found that auditory and visual discrimination of word elements are characteristic of those who succeed in acquiring primary-grade vocabulary (34:379). However, this auditory and visual discrimination may or may not be characteristic of those who failed to learn this vocabulary. Certainly, the importance of visual perception was demonstrated in the area of reading in such studies as Helen Robinson's comprehensive investigation into causes of difficulty in reading (11).

Kinesthetic and tactual presentations. In 1961, Lockard and Sidowski corroborated the theory of Grace Fernald (45:263), who, forty years earlier, had advocated the use of tactual (finger tracing) and kinesthetic (handwriting) methods in connection with learning words. In the more recent experiment, approaches involving audio, visual and

combined audio-visual responses were combined with overt (written) and covert (non-written) responses. There was no significant difference between fourth and sixth graders for overt responses. But the fourth graders did less well than sixth graders when they used covert responses. Results appeared to indicate that responses that involve tactual or kinesthetic action or oral activity facilitate learning, especially at the fourth grade level.

The multi-sensory approach. Research results indicated that sensory learning which involves visual, auditory, oral, tactual and kinesthetic activities contributed to optimum learning, since inclusion of these methods yields more avenues for input and output of impression and mediation. Thompson recommended that prolonged practice be provided for acquisition of facility in well-integrated perceptual processes (86:786). The foregoing research indicated clearly that a method which incorporated a multi-sensory approach with early vocalization, and which provided for development of auditory memory span (proven to affect comprehension as well as recognition), would contribute to learning. O'Conner and Hermelin reported an increase in the rate and efficiency of learning using cross-modality with retardates (53:412).

In order to incorporate a multi-sensory approach which would provide a range of input to accommodate all neurological impairment in the sample for this project, both the content and method of presentation had to be designed appropriately. For example, because visual access, vocalization and audition by the teacher and/or pupil and tactile

involvement in terms of writing were necessary in order to maximize the input, this influenced the amount and type of content, sequence, as well as method of presentation used with the phonetic program.

Method of presentation. In order to focus the attention of the pupil on the learning task, a method of presentation was necessary which would eliminate distraction. A research project recently completed by Silberman under the auspices of the Office of Health, Education and Welfare is pertinent in this area of instructional technology and programming (85). Part of this 1964 project involved teaching children at first-grade level how to phoneticize trigrams in an effort to determine whether frequent exposure to words in various contexts would result in inductive recognition of letter-sound relationships which would enable the children to attack unknown words with some sense of independence. Difficulty was encountered with the trigram presentation and verbalization. First, the trigrams were tape-recorded. It was found that the taped versions were not as effective as oral presentation by the experimenter. One explanation advanced was that the presentation by the teacher allowed for assessment of the learning situation and appropriate modification of the pacing of the teaching program to suit individual differences. Thus, it was felt that a teacher should administer the content of the experimental phonetic reading program, not only because of the increased effectiveness of the oral presentation, but also because this made possible guidance of the pupil's oral responses.

In a study of oral versus non-oral methods of teaching reading

by means of an auto-instructional device, McNeil and Keislar concluded that oral responses required of beginning readers facilitate the recognition and comprehension of printed words and sentences. An explanation offered was that the greater achievement with overt vocalization was due largely to the distinct stimulus in saying words aloud which is required for mediation of the obtained effects (75:105).

Rosenbaum conducted a study of the effect of direct versus vicarious verbalization on retention. In an effort to account for the greater retention with overt verbalization, two hypotheses were advanced: (1) Vocalizing directs attention to more distinctive properties of the stimulus objects. (2) The oral response of identifying an object (a word) is required for mediation of the obtained effect (60:108). Rosenbaum thought that the sound of the word is usually an old stimulus, in that most words are at least within the child's <u>listening</u> vocabulary. The <u>sight</u> of the word may be considered as the new stimulus. He concluded that after repeated practice of saying the printed words and sentences out loud, the response to the sound becomes associated with the sight of the words; and that at this time the oral stimulus becomes less necessary, giving way to implicit speech movements (60:105).

Corroborative results were obtained by Cantor (1955), Dietze (1955) and Jeffrey (1953). All three found that the verbalization of names (labels) during pre training or training leads to more accurate discrimination among stimuli, and that transpositional learning is facilitated by verbalization (21:341; 27:258; 39:331).

Thus, the superiority of the direct verbalization over

vicarious verbalization as revealed through these studies indicated the benefit to be attained by its incorporation as not only vocal input by the student but as also a reinforcement in the learning procedure necessitating guidance by the teacher.

It became apparent that it would be beneficial to incorporate a method by which exposure to the program frames could be controlled and the incidental distraction minimized, still allowing for written responses by the pupils. The Grolier Min/Max II, used by Hewett, Mayhew and Rabb in their reading program for exceptional children, was selected for use with the experimental phonetic reading program.

The Format of the Experimental Phonetic Reading Program

Prompting and Pacing

With respect to the method of presentation, Cook and Kendler, on the basis of their 1956 findings, reported that prompting was more effective than confirmation. Subjects who were continually prompted with the correct response before they made their own response did better on a post test than did subjects who were required to make a response before being presented with the correct response. This was interpreted to mean that the proper mind-set, with a correct initial image for performance, was superior to a corrected image after trial-and-error had made it possible for incorrect associations to be formed (23:91).

This supported Skinner's theory of pacing the programing of a

learning situation so that small, well-planned steps guarantee correct, rewarded and strongly-reinforced responses. This seemed especially appropriate for exceptional pupils.

It was apparent that the experimental phonetic reading program would need to be systematic and consistent in its format, progressing in difficulty with incremental steps. Based on a study which he conducted in 1964, Wittrock concluded:

> The children have to learn or must be taught systematic ways to discover and to eliminate many incorrect responses. Practice and reinforcement for the development of concepts and their application to a variety of problems appears to be the most effective treatment (78:73).

With regard to the background and experience of the child, Wittrock stated:

> An element in the event is the student's history with the subject matter or closely related area. Discovery learning usually is confined to hierarchically arranged subject matter in which the learner has considerable background (78:85).

The Nature of the Cue

With regard to the cue which, according to the research findings, figures so prominantly in the prompting procedure, Wittrock concluded:

> The important finding of this study is that their ability (that of the children) to do these things (learning by discovery) seems to be related to the types of cues and problems they have been presented with in the past (79:98).

Kittell (1957), Kersh (1958), Craig (1956) and Fergus and Schwartz (1957) concur in this view:

> When the dependent variables are retention and transfer within a class or within a concept, giving the class cue or mediator for the concept is the most effective cueing (43:404; 42:291; 24:234; 31:138).

A method of prompting termed "errorless training" by Terrace, Moore and Goldiamond was used in a reading program for exceptional children developed by Hewett, Mayhew and Rabb (36:40).

Use and fading of the form involved with errorless training was incorporated in the experimental phonetic reading program. The use of the box around the cue and the appropriate answer guided the pupils in the early stages of learning and reinforced correctness and feelings of success which were found so important in the maintenance of persistence in the learning process.

For example, in teaching the letter "b", the following approach was used:

1. The letter in the box is "b". Can you find another letter like it? (without distractors)

   [b] [b] [b] [b]

   (All are correct answers.) --

2. The letter in the box is "b". Can you find another letter like it? (with distractors)

   [b] c [b] r

   (The center item is correct.)

3. The letter in the box is "b". Can you find another letter like it? (fading form with broken lines)

   [b] r [b] t

4. The letter is "b". Can you find another letter like it? (no form)

   b c b l

Using the same errorless training approach with forms, the program moved on from the individual letter, to the letter as placed in a word, to the sound value which it had in the word. Upper and lower-case letters were used.

A final segment of the program gave children an opportunity to identify the letters and sounds in lists of unknown words. Lastly, they were given a chance to decipher the lists of unknown words on the basis of what they knew about the letters and sounds.

For many students, the nature of the learning situation, their interest in the subject and the challenge of the interaction can provide intrinsic motivation and reward. However, for many students, the learning situation is not motivating since the subject matter may not be of interest to them, learning may hold no value for them and what may be a challenge to the more able student is perceived as frustration to the student who is limited in what he brings to the learning situation. Therefore, in the interest of motivation and in the interest of reinforcement certain extrinsic reward should be made available within the learning situation.

Primary reinforcement in the form of candy and other edibles is recognized as a form of reward while secondary reinforcement in the form of recognition and praise is also acknowledged as effective. Tokens are reported as an effective method of reinforcement. The tokens are earned on a schedule of correctness, for example, and are later redeemed for primary reinforcement in the form of edibles or other symbolic reward such as money, which, in turn, can be redeemed

for something else (16:1).

Secondary reinforcement in the form of praise and the use of check marks for correctness which in turn acquire a recognized value in terms of tangible reward have been used.(36:41).

The role of the teacher in the provision of secondary reinforcement has been noted. For example, Silberman found that presentation of trigrams by an investigator was more effective than presentation via tape recording (85:4). The implication is that there is a reinforcing property inherent in presentation by the investigator that is not possible with the equipment. This is involved with social conditioning. Because secondary reinforcement proved effective with the subjects in the experimental phonetic reading program, it was used as the reward to stimulate motivation and to maintain perseveration on the part of the pupils. Verbal praise was used during the lessons in connection with correct answers. At the end of the lesson, an illustrated paper seal was given to the pupil on the basis of good performance. The pupil then pasted this seal on the appropriate square on a calendar sheet indicating the month and day of the particular lesson. Performance level was established by the amount of correct answers, the reaction of the teacher and observers who witnessed and rated each lesson using a rating form. The three original pupils who entered the experimental phonetic reading program were already conditioned to the use of primary reinforcement. Two of the pupils thereafter moved and could no longer continue with the experimental phonetic reading program and the remaining pupil, who continued in the program, was conditioned to the use of secondary reinforcement.

CHAPTER III

THE PHONETIC PROGRAM AND ITS PRESENTATION

Formulation of the Experimental Phonetic Reading Program

The experimental phonetic reading program was formulated on the basis of the findings of research investigations in the area of programed reading instruction for exceptional pupils as discussed in Chapter Two of this paper. The program itself emerged as a result of the use of phonic generalizations as recommended by McKee in the light of the findings of Moore, Bloomfield and Barnhart who indicated the degree to which the sounds and letters of the English language were consistent in their correspondence, and the value of teaching sounds not as isolated utterances but as sounds within whole words. Edelman's conclusions on the basis of his research indicated the value of using initial sounds to establish the sound patterns of the language.

Presentation of the Experimental Phonetic Reading Program

The work of Silberman, Rudisill, Mulder and Curtin, Levin, Meyer and Naeslund and others influenced the method in which the experimental phonetic reading program was to be presented and its use by the teacher as well as the sequence of programing for instruction.

The research done by many other investigators indicating that presentation should be multi-sensory not only for normal but especially for exceptional children, resulted in the auditory, vocal, visual and tactual aspects of the program.

The importance of both prompting and confirmation was also revealed in research findings. A method used by Hewett, Mayhew and Rabb termed "errorless training" by Terrace, Moore and Goldiamond looked promising as an appropriate method of achieving incremental presentation. It incorporated the use of the Grolier Min/Max II teaching machine so as to expose the pupils to a single instructional frame in appropriate sequence.

The program was designed to provide phonetic instruction in the sounds for the consonants in the alphabet in both upper and lower case, except for "X" and the vowels. "X" was difficult to program for the purposes of this study since it often has the "Z" sound in initial position and since the words in which it appears are outside the vocabulary of the pupils who participated in the study. It was felt that its inclusion, like that of the vowels would prove distracting for the pupils in this program. Therefore, the value of the remaining twenty letters of the alphabet, both upper and lower case, in initial position in words which were within the recognition vocabulary of the pupils in this study, received the focus for the instruction in this study.

A final segment was planned in which the pupils were given the opportunity to apply to unknown words the knowledge of the sounds of both upper and lower case letters which they had learned.

The Experimental Phonetic Reading Program

Instruction in the experimental phonetic reading program proceeded in four phases. The first phase of the program provided a review of the words learned in order to facilitate word recognition and thus permit the pupil to focus on the letters and their sounds. Word recognition was, of course, involved since the sounds of these letters as they were enunciated in the selection of words was basic to the lesson. However, word recognition had to be facilitated, so that the instruction in phonics could proceed.

For the same reason the first and second sections in the second phase were concerned with the recognition of words used in the lesson being introduced. In only a few cases was it necessary to use words which did not appear in the three pre-primers of Ginn Series. The knowledge of the words in those three books was a pre-requisite to starting the experimental phonetic reading program. However, in a few instances, simple words were introduced and used, when insufficient words were found in the Ginn Series involving a particular initial sound.

The second phase was the instructional phase for the study of initial letters and their sounds as they are uttered in specific words within the recognition vocabulary of the pupils. In this second phase, the following learning tasks were involved:

- recognition of words
- initial letter recognition
- initial letter recognition within known words

- reconstruction of words with pupil writing in the initial letter which was constant within individual lessons
- discrimination of similar initial letter...here for the first time, the words studied in the lesson are presented simultaneously on a horizontal line, and the phoneme-grapheme similarity of the initial letters were studied. Cards with the letters and words were used by the pupil in answering, in order to permit the pupil tactile as well as audio, visual and articulatory reinforcement, and to emphasize the similarity of the initial letters of the words used.
- reinforcement of the initial letter and sound within known words
- testing for recognition of the initial letter and its sound in an unknown word, with application in unknown words
- discrimination of word and initial letter

In phase three, recall was employed to refresh the knowledge of the pupils for the initial grapheme-phoneme relationship for the previous lesson. At this point, the pupil was asked how three words such as "Betty", "Bunny", and "Balls" are the same. They all start with "B". They all start with the sound of "B" in initial position. Thus, pupils were guided to formulate a phonic generalization. Within the same phase, the recognition of the initial grapheme-phoneme combination from the previous lesson was tested and reinforced.

In phase four some follow-up exercises related to the current lesson were introduced. These provided the pupil an opportunity to apply what he had learned with regard to the initial letter and its sound within known words. In addition, pupils had an opportunity to write in letters which corresponded to given sounds.

Thus the lessons involved words which were within the recognition vocabulary of the pupils, except when they were asked to apply

what they had learned with unknown words. The lessons provided for review, introduction of new material, recall, application and testing.

With the conclusion of the instruction in the experimental phonetic reading program, the final section of the program was administered to pupils. In this section pupils were tested on their ability to apply to unknown words, the phonetic skills in which they had received instruction.

This final section consisted of ten segments containing material on both upper and lower case letters as follows: Segment one involved recognition of the words formerly used in the instructional part of the program followed by segment two which involved the testing of the recognition of the initial letter and its sound. In section three, the pupil was tested on his ability to complete the partial word by supplying the missing initial letter. In section four his ability to give the sound for the initial letter was tested, while in section five the same skill was under study, but here was involved with distracting words as well. Segment six followed the format of section five, except that section six was involved with letters.

Segments seven and eight tested the ability of the pupil to recognize the initial letter, and to reproduce its appropriate sound, using unknown words not used previously in the experimental phonetic reading program. Sections nine and ten tested the ability of the pupil to recognize and identify the initial lower and upper case letters and their appropriate sounds in lists of unknown words beginning with upper case initial letters, lower case initial letters and lastly,

mixed lower and upper case initial letters. Finally, pupils were given the opportunity to decipher unknown words on the final list on the basis of what they knew about the letters and their sounds. The unknown words consisted of those with appropriate initial sounds not previously used in the teaching phase.

There were forty lessons in the main phonetic instructional phase of the program. Twenty lessons in lower and twenty lessons in upper case were taught. These were followed by twenty lessons, each incorporating testing on a single letter in both lower and upper case. The total program amounted to sixty lessons per pupil. Twenty letters in the alphabet were used, excluding the vowels and the letter "X". The vowels proved difficult to program, due to their variance in sound and the paucity of words within the recognition vocabulary of the pupils to accommodate the instruction of a specific vowel having a a specific sound. The letter "X" promised difficulty for programing since it often has the sound of "Z" in initial position and, as with vowels, the supply of words needed as vehicles to teach this sound was not within the recognition vocabulary of most of the pupils involved in the study.

Administration of the Experimental Phonetic Reading Program

The presentation of the experimental phonetic reading program provided both prompting and confirmation. The prompting was provided through ample cueing which was used at the outset of instruction and gradually faded as learning progressed. Confirmation was provided

through both audio and verbal feedback as to the correctness or incorrectness of responses. The teacher indicated verbally to the pupil the degree of correctness of his response and, in addition, a visual confirmation appeared beneath correct answers on the program.

The program involved auditory, visual, articulatory and tactile input. Finding the correct response involved visual discrimination; indicating it involved articulatory participation. Listening to the verbalization by the teacher involved auditory perception and tactile input was involved since the pupil wrote in missing letters, pointed to responses and picked small cards with letters and words printed on them.

The immediate confirmation provided in the program was followed by reinforcement. Although a few pupils in the experimental phonetic reading program had been involved in another program in which primary reinforcement had been used, secondary reinforcement was used in the experimental phonetic reading program and those accustomed to the primary reinforcement were gradually conditioned to it. Decals were used for this secondary reward in order to reinforce learning. Correctness of pupil response was indicated by an appropriate response on the part of the teacher. At the same time, the teacher recorded the correct answer. At the end of the lesson, decals were awarded to the pupil on the basis of the correct answers. These were pasted on a calendar page in the box corresponding to the day on which the lesson took place.

Procedural Steps

Following formulation of the experimental phonetic reading program, the program was reproduced in the form of lessons. Staff, including personnel for teaching and observing, was interviewed, selected and trained for participation in a pilot study for the purpose of trying out the experimental phonetic reading lessons.

Two months were devoted to the pilot study. At its conclusion changes in program and procedure were made appropriate to reactions of pupils at the Neuropsychiatric Institute who had participated in this pilot investigation.

Selection of A Sample

In order to randomize the selection of a sample for participation in the study, agencies were contacted, informed of the study and invited to refer pupils. Publicity describing the research project was developed in order to provide the entire community with knowledge about the research and the opportunity for pupils to participate. As a result of this, publicity appeared in metropolitan newspapers in every section of Los Angeles for both purchased and free-delivery newspapers, in order to equalize the dissemination of the information concerning the research study and thus randomize the pupil referrals for participation. Nora Sterry Elementary School, a public school in Los Angeles City School District, also participated in the research study. As a center for remedial education for a specific area within West Los Angeles, it was a source of referrals. In some cases, the

fact that both parents were employed meant that they could not provide transportation for their child to reach U.C.L.A. campus for their lessons in the experimental phonetic reading program. Therefore, lessons were also provided at the Nora Sterry School.

The Sample

Community response was enthusiastic. Criteria used in selecting subjects included that they be severely emotionally disturbed, neurologically impaired and/or mentally retarded and possessing some words within their sight vocabulary from the three pre-primers in the Ginn reader series. Ability to recognize these words was necessary since this selection of words was used in the experimental phonetic reading program as vehicles for teaching the sounds of the letters.

Each referral was interviewed. Criteria for entrance into the experimental phonetic reading program included:

1. Lack of knowledge of phonics as measured by testing children on the sounds of the letters in the alphabet. Children scoring fifty per cent or less on this test were permitted to enter the program, provided that they could
2. Recognize the words in the vocabulary of two out of three of the three pre-primers in the Ginn Series. Vocabulary in these three books is as follows:

   First Pre-Primer: My Little Red Story Book 19 words

   Second Pre-Primer: My Little Green Story Book 23 words

   Third Pre-Primer: My Little Blue Story Book 14 words

3. Be referred by school, physician, psychologist, agency or parent, etc.
4. Establish incidence of inpairment which was emotional, mental or neurological.

There were seven pupils in the emotionally disturbed group. Three were girls, ages fourteen, seven years two months and eight years eight months. Their intelligence quotients ranged from 80 to 92, with one girl untestable. The four boys ranged in age as follows: seven years five months, six years ten months and two boys aged eight. Intelligence quotients for the boys included one boy with 140 IQ, one with 78 IQ and the remaining two boys were untestable.

The mentally retarded group also consisted of seven subjects, three girls and four boys. The girls were ages six, fourteen and eleven years four months with intelligence quotients of 75, 69 and 59 respectively. The four boys were ages ten years six months, seven years four months, ten years two months and seven years. Their intelligence quotients were as follows: 68, 70, 65 and 70.

The neurologically impaired group included five boys, ages seven years seven months, six years five months, six years seven months, ten years seven months and nine years. Intelligence quotients for this group were as follows: 78, 82, 128, 77 and 97, respectively. Their neurological impairment included a 5 per cent hearing loss due to a congenitally deformed ear...corrected with hearing aid, sight loss due to eye muscle difficulty, a speech impairment due to a cleft-palate now

surgically corrected and finally, what was diagnosed by the referring agency as "sluggish neural transmission."

Because of the mention of impaired dominance in the literature in connection with reading disability, pupils in this study were given laterality tests. One theory is that pupils who have mixed dominance, that is, preference for direction of handedness, eyedness or footedness which is not consistently right or left have a tendency toward reversal in perception, and hence difficulty reading from left to right and perceiving letters appropriately. Therefore, laterality tests were administered to the sample of pupils participating in this study. Out of nineteen pupils, twelve had consistent preference for the right side in handedness, eyedness and footedness. It was not possible to get results for two of the subjects. Of the remaining pupils, three had right preference and one had left preference for hand and foot. One had mixed dominance with regard to eyedness. Finally, one subject had right preference for hand and eye but left preference for footedness. The mixed dominance for five subjects occurred in one case of emotional disturbance, two cases of mental retardation and two cases of neurological impairment. (See Table One.) However, twelve out of seventeen pupils available for testing revealed consistent right hand dominance with regard to handedness, footedness and eyedness. Apparently, mixed dominance was not a significant factor with regard to reading disability among the sample participating in this study.

TABLE I

EXPERIMENTAL PHONETIC READING PROGRAM

The Sample

Number Name	Sex	IQ	Age	Laterality		
				Hand	Eye	Foot
EMOTIONALLY DISTURBED-7						
1. Girl	F	--	14	R	R	R
2. Girl	F	80	7-2	R	R	R
3. Girl	F	92	8-8	R	R	R
4. Boy	M	140	7-5	R	L	R
5. Boy	M	78	6-10	R	R	R
6. Boy	M	--	8-0	-	-	-
7. Boy	M	--	8-0	-	-	-
MENTALLY RETARDED-7						
8. Girl	F	75	6-0	R	R	R
9. Girl	F	69	14-0	R	R	R
10. Girl	F	59	11-4	R	L	R
11. Boy	M	68	10-6	R	R	R
12. Boy	M	70	7-4	R	R	R
13. Boy	M	65	10-2	R	L	R
14. Boy	M	70	7-0	R	R	R
NEUROLOGICALLY IMPAIRED-5						
	M	78	7-7	R	R	R
15. Boy	M	82	6-5	R	R-L	R
16. Boy	M	128	6-7	R	R	R
17. Boy	M	77	10-7	R	R	L
18. Boy	M	97	9-0	R	R	R
19. Boy	M					

Variables

Dependent variables included pupil progress with regard to instruction with the experimental phonetic reading program in terms of number of correct responses and their reaction in a behavioral context in terms of a rating scale of one to six as determined by a team of observers.

Independent variables included the experimental phonetic reading program as administered on the Grolier Min/Max II and the procedure which the teachers were trained to use with the pupils.

Control Procedures

While control of variables could not be done with absolute certainty, it was undertaken with procedures designed to control variables with a high degree of probability. Pupils were seen on a regularly scheduled basis, three times a week for programed phonetic reading instruction. Lessons were approximately thirty minutes in length. Data pertaining to the reading instruction was recorded by the teacher while the observational data was recorded on forms designed for this purpose using a scale ranging from one to six.

Pupils seen on the U.C.L.A. campus were taught on the north campus in rooms made available for the project by Dr. Madeline Hunter, Principal of the University Elementary School. One-way windows enabled the observation team to collect behavioral data concerning the teaching situation. Those students seen off-campus were also taught under conditions carefully controlled for uniformity. Behavoral data

was similarly collected here. Objectivity of the observation teams was controlled by assigning observers randomly to teaching situations and also testing statistically to ascertain that there was no significant difference between observational ratings made by observers.

Control procedures included training of teachers and observers who worked with the pupils in the procedure to be used. The program was prepared and used in the same way for subjects. The number, sequence and content of lessons was the same for all pupils, thereby ensuring uniformity of instructional materials for control purposes. Any possible Hawthorne Effect was minimized since all pupils and staff were in the experimental group and subjected as closely as possible to the same treatment and conditions.

In order to randomize the selection of staff members, publicity was planned with the University newspaper which is given free to students throughout the U.C.L.A. campus. In this way, information concerning the research study was made available to all U.C.L.A. students. They were invited to participate in the study. Their response was enthusiastic. Forms were made available to those who applied. Staff members were then selected by randomly drawing these forms. Prospective staff members were then contacted.

In order to determine a profile for the individuals who were conducting the tutoring of the pupils in this experimental phonetic reading program, a questionaire was administered to them. Questions included those designed to reveal attitudes related to professional goals and research as well as to determine age, grades and extent of

activities in which respondents participate. These questionaires were then administered to a random selection of students on the U.C.L.A. campus in order to determine whether the research staff, which was comprised of U.C.L.A. students, was representative of the larger student body at U.C.L.A. Results are as follows:

TABLE II

	Student staff	General student
Age	22	25
Grade point average	2.97	3.00
Ultimate degree goal		
B.A.	7	5
Masters	8	5
Doctorate	7	7
Major		
English	2	4
Psychology	11	7
Sociology	2	3
Science	3	3
Other	5	1
Reason for choice of major:	work with children help others	work with children
Ultimate goal:	teach	teach
Sex	female	female
Marital status	single	single
Previous participation in research	Yes 4 No 19	Yes 3 No 15
Average working hours in addition to school	7.5	9.5

Thus the Null Hypothesis of no difference between U.C.L.A. students who participated in the research study and randomly selected students on the U.C.L.A. campus was accepted. The profile appears to be one of a female, single, with a 2.98 grade point average, 22.5 years of age, working toward a B.A. degree with possibly the intention of continuing studies in Graduate School in

the fields of English, Psychology, Sociology and Science, predominantly. Most respondents were prospective teachers who wished to work with children and help others. The necessity for a fifth year in connection with the teaching credential is one of the reasons for the intent to continue in Graduate School. Most participants had not previously participated in research study and were working part-time in addition to attending school.

Instruments

Each programed lesson in the experimental phonetic reading program became an instrument for the collection of data in that the correct answers for each section were used as data in the comparisons made for pupils using the experimental phonetic reading program.

The forms used by the observation teams were utilized for collection of behavioral data concerning the reaction of pupils to the sections of the phonetic program and also for the collection of anecdotal data of an affective nature including evidence of pupil satisfaction or distraction with the instruction in the experimental phonetic reading program.

Questionaires were administered to the teaching and observation staff to determine the characteristics of those people who were working with the pupils in the project, as well as their evaluation of their participation in the research. Questionnaires were also administered to the parents of pupils participating in the project in order to determine their evaluation of the effect of the

participation on their child.

Data recording was designed and a program for reduction of raw data was formulated. Evaluation was to include the analysis of the data collected with instruments as follows: (1) experimental phonetic reading program data was collected on data sheet attached to each lesson, (2) anecdotal information concerning pupil behavior during the lessons was collected by teams of observers using rating sheets and (3) evaluation of the effect of the experimental phonetic reading program was obtained from parents, administrators and staff by means of a questionaire.

Statistical Procedure

Analysis of variance was used for the comparisons between groups with regard to intelligence and pupil progress in various facets of the experimental phonetic reading program. Significance of differences were subjected to the "t" test for comparisons based on sex and age of pupils as well as for differences between initial and terminal scores for the pupils participating in the experimental phonetic reading program.

Analysis of variance was used with the behavioral data in the determination of any significant differences between observers in their assessment of pupil behavior. Chi square was used to determine any significant difference among members of the staff with regard to their evaluation of the effect on pupils of participation in the research project, as compared with administrative and parental

reaction. Chi square was also used in a comparison made between members of the research staff and a random selection of U.C.L.A. students. Within established degrees of freedom, rejection of the hypothesis was examined at the .05 and .01 levels.

CHAPTER IV

THE FINDINGS

Purpose

The specific purpose of the experimental study was to design a programed sequence of instruction in phonics for exceptional pupils and to evaluate the progress of such pupils taught with this program. The pupils participating in the phonetic reading program were identified within three groups: emotionally disturbed, neurologically impaired and mentally retarded.

Experimental Research Design

The proposed comparisons of reading achievement were accomplished by means of the following testing procedures:

1. Scores on the reading lessons included in the experimental phonetic reading program.
2. Assessment by observation teams, staff and parents.

Statistical Procedure

The proposed determinations were accomplished by means of several different statistical procedures. Analysis of variance was used for the comparisons regarding intelligence and achievement in the experimental phonetic reading program. Determination of significance of differences between observers in recording behavioral data was

accomplished by means of analysis of variance. Chi square was used to analyze the difference between members of the research staff and other U.C.L.A. students. Similar comparisons were made using chi square for the evaluation of pupil participation in the experimental phonetic reading program by staff, parents and administrators. "t" tests were used for comparisons based on sex and age of pupils as well as for differences between initial and terminal scores for the pupils participating in the experimental phonetic reading program.

Pupil Population

Of a total of nineteen pupils who began the study, seventeen remained at the time of the last assessment at the end of the ten-month experiment. They included seven emotionally disturbed pupils, three girls and four boys; seven mentally retarded pupils, three girls and four boys and five boys who were neurologically impaired. Mean intelligence quotient for the testable pupils was as follows: 98 for the group which was emotionally disturbed, 68 for the mentally retarded group and 92 for the neurologically impaired group. The overall intelligence quotient for the sixteen testable pupils in the study was 86.

Hypotheses Tested

The hypotheses formulated for this research were considered in terms of the Null Hypothesis of no difference with respect to the following measure:

Hypothesis

1.0 Initial and terminal scores within each of the three groups of pupils involved.

2.0 Scores between each of the three groups of pupils involved.

3.0 Intelligence quotient of pupils.

4.0 Sex of pupil.

5.0 Age of pupil.

6.0 Rating of behavioral data by observation teams.

7.0 Evaluation of effect upon pupils of participation in the experimental phonetic reading program by staff, parents and administrators.

The Findings

The findings, based upon analysis of the data, are expressed in terms of whether the hypotheses were supported or rejected.

Hypothesis

1.0 Initial and terminal scores within each of the three groups of participating pupils. Results indicated support with regard to initial and terminal scores for neurologically impaired pupils. However, significant differences were found to exist between initial and terminal performance for emotionally disturbed and mentally retarded pupils.

2.0 Scores between each of the three groups of pupils involved. The Null Hypothesis was accepted with regard to a compari-

son between emotionally disturbed, mentally retarded and neurologically impaired pupils with regard to their achievement in the phonetic reading program. No difference in progress was found for the following sections of the experimental phonetic reading program: review of words, word recognition, recognition of letter in unknown words, follow-up skill lesson, discrimination between word and letter and final testing in letters and sounds.

3.0 Intelligence of pupils. The Null Hypothesis was accepted with regard to intelligence quotient for the three groups of participating pupils. An F ratio of .254 was found. Confidence levels were 3.98 (.05 level) and 7.21 for .01 level.

4.0 Sex of pupils. While the Null Hypothesis was accepted with regard to the boys, a significant difference was found for the girls on the basis of progress between initial and terminal scores. "t" score of 7.2 for the girls exceeded confidence levels of .05 (2.09) and .01 level of 2.85.

5.0 Age of pupils. The Null Hypothesis was accepted for pupils above the median age of 8.0. However a significant improvement was found for younger students whose age did not exceed median age for this sample.

6.0 Rating of behavioral data by observation teams. The Null Hypothesis of no difference in ratings by members of the

observation teams was supported by the findings resulting from analysis of the contents of the rating sheets using Analysis of Co-Variance. Confidence levels of 3.84 (.05 level) and 6.63 (.01 level) were not exceeded by the F scores of 0.53 for the observations of female pupils and 0.19 for the observation of male pupils. Thus, analysis of the reaction of pupils to the program and observers to the pupils did not result in any significant differences.

7.0 Evaluation of the effect upon pupils of participation in the Experimental Phonetic Reading Program by staff, parents and administrators. Chi square was used to analyze the the results of questionaires completed by parents, administrators and staff with regard to the effect on pupils of their participation in the experimental phonetic reading program. No significant difference was revealed with regard to the evaluation completed by these groups. Therefore the Null Hypothesis is supported.

The following chi square table reveals the results of these comparisons:

TABLE III

CHI SQUARE-EVALUATION OF PROGRAM
STAFF, PARENTS, ADMINISTRATORS

Averages			Differences	χ^2	Confidence levels
	Parents Administrators	Staff			.05= 9.488 .01=13.277
Item					
1	3.846	3.50	.346	9.308	Null accepted
2	3.923	2.928	.995	6.806	" "
3	3.769	4.142	.373	5.495	" "
4	3.643	3.357	.286	7.558	" "
5	4.153	4.00	.153	1.1487	" "

The criteria on which the effectiveness of the program was judged pertained to:

1. Confidence of pupils with regard to reading.
2. Attitude of pupil toward reading.
3. Knowledge of the sound of the letters.
4. Improvement in reading.
5. Overall benefit of participation in the experimental phonetic reading program.

Evaluation was made on a rating scale of one to five, one referred to "no benefit", two to "little benefit", three to "some benefit", four to "much benefit", while five was equivalent to a rating of "great benefit". The predominance of responses was found to be in column four which is equivalent to a rating of "much benefit". In response to the question concerning continuation of the program,

the response was in the affirmative. In the space provided for the expression of individual reaction by the respondents, the necessity for additional time with the program was mentioned by the majority of those responding.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The findings based upon analysis of the data are summarized briefly at this point. The following is a recapitulation of the results of this study.

Summary of Findings

1. Emotionally disturbed and mentally retarded pupils made significant progress between initial and terminal performance in the experimental phonetic reading program.

2. No significant differences were found between groups on the basis of scores in specific sections of the experimental phonetic reading program.

3. There was no significant difference in intelligence.

4. Significant progress in the experimental phonetic reading program was made by the girls.

5. Younger pupils, whose age was below the median age of eight years for this sample, made more significant progress in the experimental phonetic reading program than did pupils whose age exceeded that median.

6. There was no significant difference between observers with regard to their evaluation of the behavioral data which they collected.

7. Staff for the research project, which was composed of U.C.L.A. students, was representative of a larger segment of the U.C.L.A. student body as determined by a comparison made on the basis of a questionnaire.

8. Evaluation by staff and parents and administrators revealed rating predominantly at the level of "much benefit" for participating pupils. On the basis of chi square analysis the Null hypothesis of no difference was accepted for the evaluation of staff as compared with that of parents and administrators.

9. Majority of pupils in this sample had consistent right preference with regard to handedness, eyedness and footedness.

Conclusions

The following conclusions are supported by the findings.

1. Emotionally disturbed and mentally retarded pupils in this sample made greater progress in the experimental phonetic reading program on the basis of initial and terminal performance than did neurologically impaired pupils.

2. Girls and younger pupils in this sample made more significant progress on the basis of initial and terminal performance.

3. The personal rapport between pupil and teacher was important according to staff members who administered the experimental phonetic reading program to pupils.

4. Mixed dominance was of no consequence with regard to the reading disability of pupils participating in this study.

5. Reinforcement, incremental increase in difficulty and controlled presentation of material were important in the administration of the program to the pupils.

Recommendations

The following recommendations proceed from the findings and conclusions.

1. Further research is needed with regard to this experimental phonetic reading program. A phase should be incorporated for medial and terminal sounds and for vowels.

2. The experimental phonetic reading program should be extended to diphthongs, digraphs and consonant blends in order to assist pupils to synthesize the sounds which they learn into a method for deciphering unknown words.

4. Further research with the experimental phonetic reading program should be longitudinal in nature and should involve a larger sample.

5. The experimental phonetic reading program should be adapted for total programed instruction without a teacher, in order to study the effect of this with exceptional pupils. This would make possible some comparisons between such a program without a teacher and the present

study which involved controlled presentation of the experimental phonetic reading program by a teacher, using the Grolier teaching machine.

6. The experimental phonetic reading program should be related to some activities involving comprehension and plot development. For example, stories which are related to the lessons might be incorporated into any future investigation.

7. Maximum sensory input should be used in terms of seeing word (visual), hearing word (auditory), saying word (articulated), tracing and/or writing word (tactual). This is especially necessary for the neurologically impaired who have brain damage and/or perceptual handicap.

8. Children who need such programs as this experimental phonetic reading program should begin such study at the youngest possible age at which they can derive benefit. In the present study, the younger pupils made the most significant progress when their initial and terminal performance was compared.

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APPENDIX A

TABLES

TABLE IV

COMPARISONS BETWEEN GROUPS ON THE BASIS OF THE EXPERIMENTAL PHONETIC READING PROGRAM

Covariate	F Score
	(.05= 6.94) (.01=18.0)
Total Program (Three Groups)	1.06 (.05= 6.04) (.01=14.84)
Total Covariates (Three Groups)	7.53 * (.05= 7.7) (.01=21.2)
Sections of the Program	
1. Review of words	1.25
2. Word recognition	.47
3. Recognition of letter in unknown words	.44
4. Follow-up skill lesson	.13
5. Descrimination between words and letters	.04
6. Final test of recognition of letters	.59
7. Final test of recognition of sounds	.009

* Significant at .05 level of confidence.

TABLE V

COMPARISONS BETWEEN GROUPS ON THE BASIS OF INITIAL VS. TERMINAL SCORES

Group	Initial Scores		Terminal Scores		"t" Score
	Mean	Standard Deviation	Mean	Standard Deviation	(.05=2.02) (.01=2.70)
I. Emotionally Disturbed	103.8	5.74	109.3	9.94	5**
II. Mentally Retarded	105.5	4.89	113.4	1.73	9.6**
III. Neurologically Impaired	102	11.61	106.9	14.79	1.6

* Significant at the .05 level of confidence.
** Significant at the .01 level of confidence.

TABLE VI

COMPARISONS BETWEEN INITIAL AND TERMINAL SCORES BASED ON SEX OF PUPIL

Group	Initial Scores		Terminal Score		"t" Score
	Mean	Standard Deviation	Mean	Standard Deviation	(.05=2.09) (.01=2.85)
Girls	103.5	1.44	113.5	2.13	7.2**
					(.05=1.99) (.01=2.64)
Boys	103.5	8.19	109	3.81	1.8

* Significant at the .05 level of confidence.
** Significant at the .01 level of confidence.

TABLE VII

COMPARISONS BETWEEN INITIAL AND TERMINAL SCORES BASED ON AGE OF PUPIL

Group	Initial Scores		Terminal Scores		"t" Scores
	Mean	Standard Deviation	Mean	Standard Deviation	
					(.05=2.01) (.01=2.69)
Above Median Age	105	5.9	114	1.37	1.28
					(.05=1.99) (.01=2.64)
Below Median Age	102.5	8.7	107	12.9	2.64**

* Significant at the .05 level of confidence.
** Significant at the .01 level of confidence.